

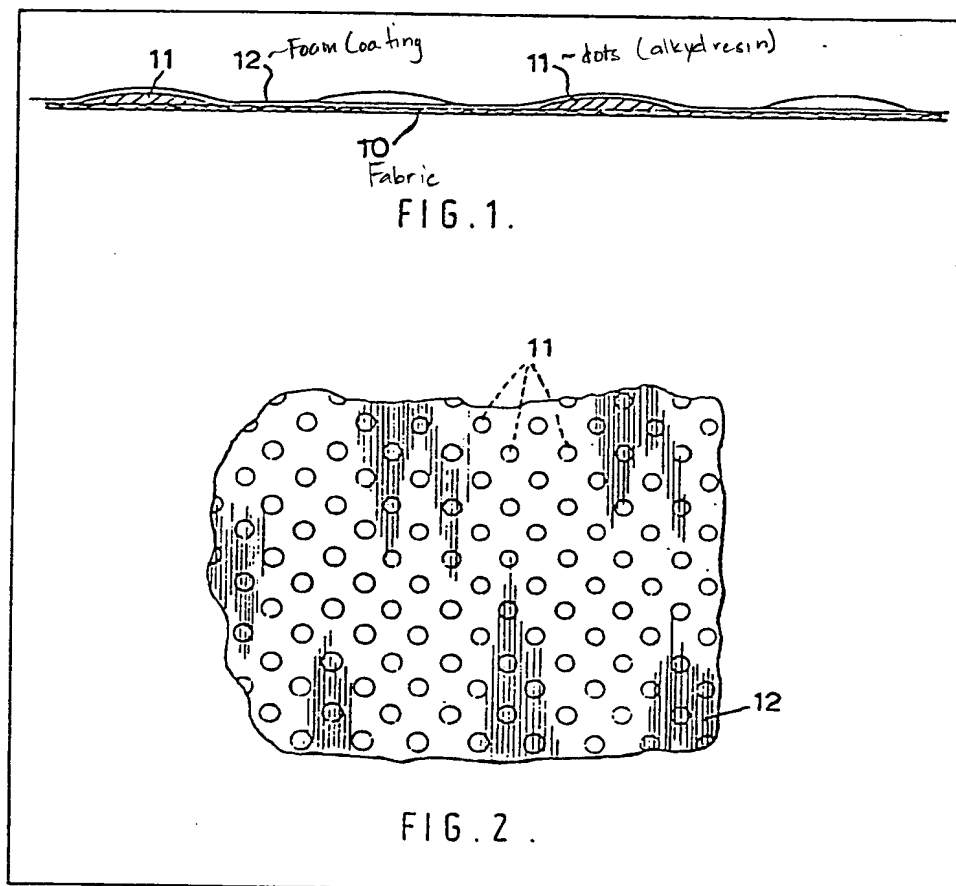
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(54) An article of footwear

(57) The article of footwear, particularly a jogger-type or like shoe has at least part of its upper made of a composite material comprising a plurality of discrete areas (11), e.g. dots 11, of plastics material on one surface of the fabric layer, and a translucent coating 12 of foamed plastics material applied over the discrete areas and the one surface of the fabric layer. The fabric layer 10 may be made of woven

nylon, polyester, cotton, viscose alone or in combination with spun staple or continuous filament. The dots 11 may be alkyd resin with solids and display a pattern to give a more robust impression. The foamed coating 12 of a mixture of acrylic and polyurathane emulsions may be spread by a knife coater to a thickness not greater than 0.05 mm and a density of about 13 g/m² and then guide dried by hot air. The arrangement gives higher seam strength and is permeable.



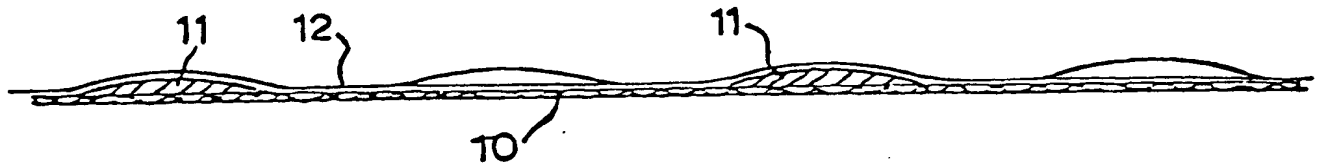


FIG. 1.

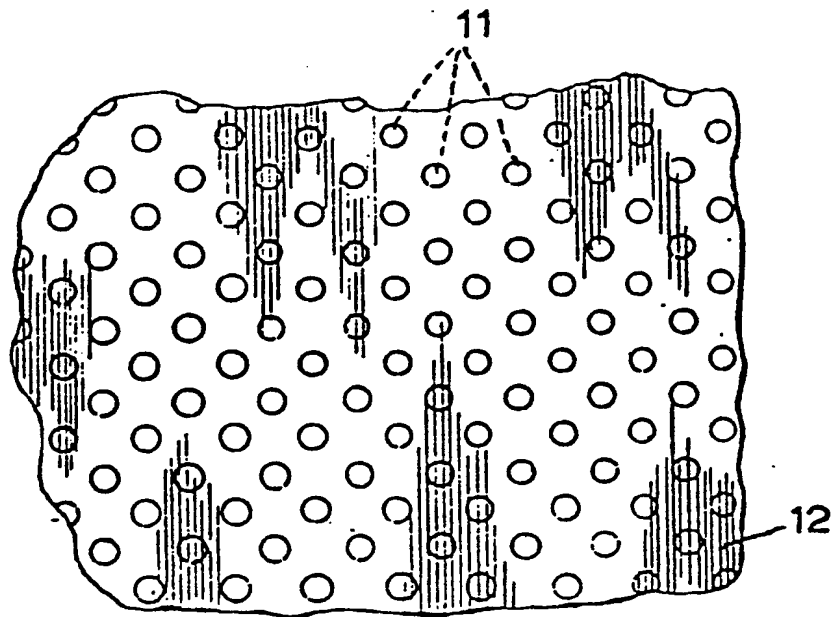


FIG. 2 .

SPECIFICATION

An article of footwear

This invention relates to an article of footwear, and more particularly but not exclusively to a jogger-type or like shoe.

Uppers of jogger-type shoes are conventionally of a nylon fabric material trimmed with plastics or rubber. However, the seams on the nylon fabric have a tendency to pull away particularly in the region of the laces and this has an adverse effect on the appearance of the shoe.

According to the present invention, there is provided an article of footwear having an upper at least part of which is made of a composite material comprising a fabric layer, a plurality of discrete areas of a plastics or polymeric binder material on one surface of the fabric layer, and a coating of mechanically foamed plastics material over the discrete areas and the one surface of the fabric layer.

The upper can have a very much higher seam strength than a conventional uncoated fabric upper, a comparable permeability and is less likely to show fraying at the edges.

Preferably, the mechanically foamed layer is the outer layer of the shoe upper and is translucent. With a translucent coating, one can perceive the relative opacity of the pattern formed by the discrete areas, e.g. dots, below and this pattern cosmetically reinforces the optical impression of a more robust material than it actually is.

The fabric is suitably formed of a synthetic fibre-forming polymer such as a polyamide.

The coefficient of friction of the coating, advantageously, corresponds or substantially corresponds to that of the fabric layer to give the coating a feel comparable to that of the fabric layer.

Preferably, the coating is water vapour permeable to allow sweating.

The invention will now be more particularly described with reference to the accompanying drawings, in which:—

Figure 1 is an enlarged section taken through one embodiment of a composite material of which at least part of a shoe upper is made, according to the invention,

Figure 2 is a view in the direction of arrow A in Figure 1.

A jogger-type shoe has a moulded sole and an upper at least part of which is made of the composite material illustrated in Figure 1, trimmed with rubber or plastics.

The composite material comprises a backing layer 10 suitably of woven nylon fabric having a density of about 120 g/m². Instead of being a nylon fabric it could be, however, a woven fabric composed of polyester, cotton, viscose or other natural or synthetic yarns, alone or in combination, spun staple or continuous filament.

Discrete areas 11 of a plastics material are applied to one surface of the backing layer 10 by a rotary screen coating machine such as the PDIIIIC machine made by Stork Brabant BV. The discrete

areas are conveniently in the form of dots and are of a cross-liacid curing alkyd resin which gives adhesion to the backing layer of a very high order. The alkyd resin emulsion should contain 65% or more solids as otherwise it will penetrate into the

backing layer. The dots are set out as a half tone image, that is to say the dots of adjacent rows are staggered with respect to one another and most conveniently have a diameter of approximately 0.9 mm. There are about 387,500 dots/m², covering 36% of the surface area of the backing layer; they are applied to a thickness of between 0.025 mm and 0.038 mm and represent a dry weight add on of about 9 g/m². The dots increase the yarn slippage resistance by about 300%.

A coating 12 of mechanically foamed plastics is applied to the dots and the backing layer by a high precision knife coater over a steel roll set at a predetermined gap. A machine made by Weiss of Bremen, West Germany is most suitable because of the high accuracy of the steel roll relative to the knife. The coating is mechanically foamed to about four times its original density and has a maximum cell size of about 0.02 mm. With cell sizes greater than 0.02 mm the coating becomes filmic as a result of shear forces during the knife coating phase. The coating is fed between the knife and the substrate comprising the backing layer 10 and the dots 11, and is spread over the entire substrate as it passes under the knife.

The coating is applied to a thickness of about yet not greater than 0.05 mm over the crowns of the fabric backing layer and a density of about 13 g/m² and it both coats and fills the fabric. At this thickness it is possible to maintain the integrity of the cellular structure. Any thicker and the coating becomes too plastics in appearance. The coating can, for example, be a mixture of acrylic and polyurethane emulsions.

The composite material is then passed through hot air dryers; the coating is quick dried.

The coating is an open cell structure and is hence water vapour permeable. The open cell structure is created due to shear forces applied during application of the coating to the substrate and the hot air drying.

The coefficient of friction is closely matched to the backing layer giving it a textile feel.

The coating is translucent. The pattern of dots visible through the coating gives the material life and texture.

The composite material has a very much higher seam strength than uncoated material with a comparable permeability and is less likely to show fraying at the edges during wear.

CLAIMS

1. An article of footwear having an upper at least part of which is made of a composite material comprising a fabric layer, a plurality of discrete areas of plastics material on one surface of the fabric layer, and coating of mechanically foamed plastics material over the discrete areas and the one surface of the fabric layer.

2. The article of footwear of Claim 1, wherein

the mechanically foamed layer is the outer layer of the upper and is translucent.

3. The article of footwear of Claim 1 or Claim 2, wherein the discrete areas are dots.

5 4. The article of footwear of any one of the preceding claims; wherein the fabric layer is of a synthetic fibre-forming polymer.

5. The article of footwear of Claim 4, wherein the fabric layer is a polyamide.

10 6. The article of footwear of any one of the preceding claims, wherein the discrete areas are of an alkyd resin.

15 7. The article of footwear of any one of the preceding claims, wherein the coating has been foamed to four times or substantially four times its original density.

8. The article of footwear of any one of the preceding claims, wherein the coating is 0.05 mm or substantially 0.05 mm thick.

20 9. The article of footwear of any one of the preceding claims, wherein the maximum cell size

of the foamed plastics coating is 0.02 mm or substantially 0.02 mm.

25 10. The article of footwear of any one of the preceding claims, wherein the coefficient of friction of the coating corresponds or substantially corresponds to that of the fabric layer.

30 11. The article of footwear of any one of the preceding claims, wherein the coating is water vapour permeable.

12. The article of footwear of any one of the preceding claims, wherein the density of the fabric layer is 120 g/m² or substantially 120 g/m².

35 13. The article of footwear of any one of the preceding claims, wherein the density of the discrete areas is 9 g/m² or substantially 9 g/m².

14. The article of footwear of any one of the preceding claims, wherein the density of the coating is 13 g/m² or substantially 13 g/m².

40 15. An article of footwear substantially as hereinbefore described with reference to and as shown in the accompanying drawings.